PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Behavioural sleep problems in children with attention deficit/hyperactivity disorder (ADHD): Protocol for a prospective cohort study
AUTHORS	Lycett, kate; Sciberras, Emma; Mensah, Fiona; Gulenc, Alisha; Hiscock, Harriet

VERSION 1 - REVIEW

REVIEWER	Samuele Cortese Cambridgeshire and Peterborough Foundation Trust
REVIEW RETURNED	30-Oct-2013

GENERAL COMMENTS	The relationship between ADHD and sleep disturbances is increasingly studied. As correctly pointed out by the authors, very few longitudinal studies have been conducted in the field. Therefore, I think that contributions like the present one may provide useful insights and add to our knowledge that derives mainly from cross-sectional studies. Another strength is the sample size. The manuscript is generally well written and clear. I have only minor or relatively minor suggestions and comments. Abstract “examine the impact of sleep problems”: this suggests a notion of causality, that can not be assessed with this study design Introduction “and objective and subjective measures of sleep often conclude disparate findings.14”. This is reflected also by the fact that the two most recent meta-analyses (Cortese et al, JAACAP 2009 and Sadeh et al., Sleep Med Rev 2006) have provided somewhat different results. The authors quote the meta-analysis by Cortese et al… They may want to quote also the one by Sadeh et al. to provide a more complete background. Similarly, stimulant medications (e.g., methylphenidate), which also work on the central nervous system, have been associated with sleep problems”: actually, they can also improve sleep in some cases of ADHD, if sleep problems are due to ADHD per se, as discussed in Konofal et al, Sleep Med, 2010…the authors may want to briefly mention this. A strong rationale to better assess the relationship between sleep disturbances and ADHD is that evidence based treatments for sleep disturbances in ADHD are still limited, as recently pointed out in a consensus conference of experts on ADHD and sleep (Cortese et al., JAACAP 2013). The authors may want to add a paragraph on this.

	Study aims The rationale for: 1) the choice of “1 year”, 2) the age range and 3) Exclusion criteria should be pointed out (in particular, why were children receiving help for sleep problems excluded? Would this lead to an underestimation of sleep disorders in children with ADHD?). Dissemination The public health impact of this study could be better described

REVIEWER	Susan Calhon PhD Hershey Medical Center Department of Psychiatry
REVIEW RETURNED	01-Dec-2013

GENERAL COMMENTS	A review of Lycett et al Behavioral sleep problems in children with attention deficit hyperactivity disorder (ADHD): Protocol for a prospective cohort study. This is a prospective study of 400 children with ADHD recruited from multiple practices across Victoria, Australia followed over a 12 month period of time at two time points (6 and 12 months)who differ on parent report of sleep problems. This is an ambitious, novel and comprehensive protocol that is likely to contribute to the understanding and treatment of sleep problems in children and young adolescents with ADHD. Overall, this is a well written and thoughtful protocol with a few suggestions made below: Background Children with ADHD also have difficulty staying asleep which should be mentioned in the first paragraph when describing extrinsic causes of sleep problems. Although PSG is expensive and not generally feasible to run in large samples, the authors may want to state that actigraphy, as an objective marker of sleep patterns, is more feasible and much less costly. Not sure that I would state that parent report is “ideal” for large studies because of the poor correlation with objective and subjective report of sleep problems in children, and that many subjective studies use self report even in fairly young children-driven by appropriate developmental age. The authors need to mention that the relationship between ADHD and sleep problems may be bidirectional or that they coexist across all levels of ADHD and persist over time or that the sleep problem symptoms are part of the syndrome because current treatments do not help with sleep problems. The authors may want to include the recently published Avon longitudinal data on children with ADHD from birth to 11 years in Journal of Sleep Research. Participants Although the authors controlled for autism spectrum disorder why were children with autism not excluded from the recruitment process and analysis considering the high comorbidity with ADHD and highest rate of sleep problems of all child psychiatric disorders? Data Analysis Is there any opportunity for the authors to control for BMI considering the association of overweight/obese children and sleep problems and ADHD and obesity (Cortese 2012 Curr Top Beh Neurosci)?

	The authors should consider analyzing the data separately for ADHD subtypes primarily inattentive versus combined type. Several studies have reported on the differences in sleep problems as a function of subtype and comorbidity (anxiety/depression versus ODD) (Mayes 2009 J Ped Psychology). Perhaps the authors could conceptualize the categories under aim 2 as the natural history of sleep problems (never, remission (no longer a problem), incidence (developed problem over 12 months of followup) and persistence (problem at all three time points). In aim 3, the authors might want to include the teacher´s assessment and association with sleep problems since data was collected at baseline, 6 and 12 month time points on most children. Minor: Mis-spelling of enrollment throughout paper and polysonography should be polysomnography on page 6 of Background

VERSION 1 – AUTHOR RESPONSE

Reviewer 1 – Dr Samuele Cortese			
1	Abstract- “examine the impact of sleep problems”: this suggests a notion of causality, that cannot be assessed with this study design	Good point. We have amended this to: “examine the longitudinal associations between sleep problems and child and family well-being functioning over a 12-month period. “	pg 3, para 1, line 10-12
2	Introduction - “and objective and subjective measures of sleep often conclude disparate findings.14”. This is reflected also by the fact that the two most recent meta-analyses (Cortese et al, JAACAP 2009 and Sadeh et al., Sleep Med Rev 2006) have provided somewhat different results. The authors quote the meta-analysis by Cortese et al… They may want to quote also the one by Sadeh et al. to provide a more complete background.	Thank you. We have updated the references accordingly.	pg 6, para 2, line 3
3	Similarly, stimulant medications (e.g., methylphenidate), which also work on the central nervous system, have been associated with sleep problems”: actually, they can also improve sleep in some cases of ADHD, if sleep problems are due to ADHD per se, as discussed in Konofal et al, Sleep Med, 2010…the authors may want to briefly mention this.	We have added a sentence about this and the appropriate reference.	pg 7, para 1, line 7
4	A strong rationale to better assess the relationship between sleep disturbances and ADHD is that evidence based treatments for sleep disturbances in ADHD are still limited, as recently pointed out in a consensus conference of experts on ADHD and sleep (Cortese et al., JAACAP 2013). The authors may want to add a paragraph on this.	Thank you for pointing this out. We have added this to our rationale in the opening paragraph.	pg 6, para 1, line 11-12
5	Study aims	Please find an explanation below and we this	

	The rationale for: 1) the choice of “1 year”, 2) the age range and 3) Exclusion criteria should be pointed out (in particular, why were children receiving help for sleep problems excluded? Would this lead to an underestimation of sleep disorders in children with ADHD?).	is also now acknowledged in the manuscript: 1) Our follow-up period was limited to 12 months in order to harmonise with RCT data collection 2) This sample was restricted to 5-13 year olds as this study was particularly interested in understanding sleep in primary school aged children with ADHD. Future work would also be beneficial in examining sleep comorbidities and trajectories in adolescents and adults with ADHD. 3) This was an important consideration for determining the efficacy of the intervention within the RCT group. If children were receiving behvaioural sleep interventions, similar to the intervention treatment, this may have impacted the outcome of the trial. Thus, these children were excluded. This could lead to an underestimation of sleep disorders in children with ADHD but determining the prevalence of sleep disorders in children with ADHD was not our aim.	1) pg 12, para 2, line 7-8 3) pg 12, para 1, line 2
6	Dissemination The public health impact of this study could be better described	We have added now elaborated on the public health impact of the study.	pg 16, para 3, line 6-9

Reviewer 2 – Dr Susan Calhon

1	Background - Children with ADHD also have difficulty staying asleep which should be mentioned in the first paragraph when describing extrinsic causes of sleep problems.	We have added, “night-time waking” with an appropriate reference.	pg 6, para 1, line 6
2	Although PSG is expensive and not generally feasible to run in large samples, the authors may want to state that actigraphy, as an objective marker of sleep patterns, is more feasible and much less costly. Not sure that I would state that parent report is “ideal” for large studies because of the poor correlation with objective and subjective report of sleep problems in children, and that many subjective studies use self-report even in fairly young children- driven by appropriate developmental age.	While we agree that actigraphy is less costly and more feasible than PSG, actigraphy still bears considerable expense ($1,200 per actiwatch) and from our experience was infeasible within a subsample of 120 children with ADHD. We are currently writing a paper on this experience. We do agree with the reviewer that the choice of the word ‘ideal’ is inappropriate. We have amended this to ‘a valid measure’.	pg 6, para 2, line 10-11
3	The authors need to mention that the relationship between ADHD and sleep problems may be bidirectional or that they coexist across all levels of ADHD and persist over time or that the sleep problem symptoms are part of the syndrome because current treatments do not help with sleep problems. The authors may want to include the recently published Avon longitudinal data on children with ADHD from birth to 11 years in Journal of Sleep Research.	This has been added to the paragraph about the mechanisms associated with sleep problems. This article is highly relevant and has been has been added to the introduction.	pg 7, para 1, line 3-4. pg 8, para 1, line 1-3.
4	Participants - Although the authors controlled for autism spectrum disorder why were children with autism not excluded from the recruitment process and analysis considering the high comorbidity with ADHD and highest rate of sleep problems of all child psychiatric disorders?	We deliberately included children with comorbid autism spectrum disorders (ASD) as we were aiming to recruit a real-life sample of children with ADHD. ADHD and ASD commonly co-occur (30%), and the DSM-5 now permits the simultaneous diagnosis of ADHD and ASD to reflect this.	
5	Data Analysis - Is there any opportunity for the authors to control for BMI considering the association of overweight/obese children and sleep problems and	We agree this would be interesting data but unfortunately we are unable to collect this information.	

	ADHD and obesity (Cortese 2012 Curr Top Beh Neurosci)?		
6	The authors should consider analyzing the data separately for ADHD subtypes primarily inattentive versus combined type. Several studies have reported on the differences in sleep problems as a function of subtype and comorbidity (anxiety/depression versus ODD) (Mayes 2009 J Ped Psychology).	Given the fact that we have recruited a clinical sample of children with ADHD, most study participants meet criteria for ADHD-Combined type. We may therefore be under-powered to analyse our data separately by ADHD subtype but will consider it.	
7	Perhaps the authors could conceptualize the categories under aim 2 as the natural history of sleep problems (never, remission (no longer a problem), incidence (developed problem over 12 months of followup) and persistence (problem at all three time points).	Thank you, this describes the groups well. We have now added very similar categories to the manuscript.	pg 15, para 3, line 7-8.
8	In aim 3, the authors might want to include the teacher´s assessment and association with sleep problems since data was collected at baseline, 6 and 12 month time points on most children.	We have now made it clearer that the 12-month outcomes for Aim 3 will be based on both parent and teacher report.	pg 16, para 1, line 1-2.
9	Minor: Mis-spelling of enrollment throughout paper and polysonography should be polysomnography on page 6 of Background	We have amended polysomnography. We believe that 'enrolment' is spelt correctly for a British journal.	pg 6, para 2, line 4